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(54) PARENTERAL SOLUTION CONTAINER AND DELIVERY CAP THEREFOR

(71) We, FORT DAVID LABORATORIES INC., a corporation organised according to the Laws of the State of Florida, United States of America of P.O. Box 6758, Hollywood, Florida 33021, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention is concerned with a parenteral solution container and delivery cap therefor.

At present parenteral solution containers are filled under atmospheric pressure, and then packed separately from their delivery caps. The separate handling of the delivery caps provides opportunities for contamination during assembly of combination.

Accordingly, it is a principal object to the present invention to provide a parenteral solution container and delivery cap which may be supplied by the manufacturer already filled and assembled so as to prevent contamination, and which may be placed into operative condition by external manipulation only.

Other objects are to provide a parenteral solution container and delivery cap which are simple in design, inexpensive to manufacture, rugged in construction, easy to use and efficient in operation.

Accordingly, the present invention provides a parenteral solution container and delivery cap therefor, the delivery cap comprising a top portion and a skirt portion, the top portion having a passage for parenteral solution, the end of the passage outside the skirt being adapted for connection to a delivery tube, the end inside the skirt leading to a hollow needle for puncturing a sealing diaphragm when the latter is positioned in the neck of the parenteral solution container, the skirt portion being adapted for engagement with the neck of the container and carrying a flexible sleeve, one end of the sleeve being attached rigidly to the skirt, the other end having an inwardly directed flange, the neck of the container being

adapted for co-operating engagement with the skirt, and the container having an outwardly directed flange for snap engagement with the flange of the flexible sleeve. 50

The invention is illustrated by way of example in the accompanying drawings in which:—

Figure 1 is a side cross sectional view of the invention. 55

Figure 2 is an exploded perspective view of the invention.

Figure 3 is a side cross sectional view of a modified form of the invention. 60

Referring now to the drawings in detail, the reference numeral 10 represents a parenteral solution container and delivery cap according to the present invention, in the pre-operative condition, in which there is a delivery cap 11 over the mouth 12 of a bottle 13. 65

The cap 11 is of a plastics material and includes a top portion 14 and a skirt portion, the skirt having an internal thread 15 engaged on an external thread 16 of the bottle. A rubber plug 17 having a thin central diaphragm 18 is fitted into the bottle mouth sealing the bottle interior 19. A central needle 20 integrally formed with the top portion 14 of the cap 11 has a passage 21 which communicates with a drip chamber 22 made of transparent plastics and fitted over a nipple 23 formed on the top portion. Another passage 24 extends through the needle 20 and is parallel to passage 21; the passage 24 communicates with an air filter unit 25 formed on the top portion. 70 75 80

The unit 25 includes a check valve 26 comprised of a steel ball 27 normally urged by a compression coil spring 28 against a valve seat 29 so as to close the passage 24. A filter pad 30 is fitted over the end of the passage 24 and secured in position by a removable bezel 31. 85 90

The drip chamber 22 is connected to one end of a hose 32 having a manually closable clamp 33 to seal the hose passage fully or in part for controlling the flow volume.

The bottle 13 includes a circular flange 34 integrally formed around the neck 35 thereof. A flexible sleeve 36 has a central opening at one end fitted around the cap 11; the cap 5 having a bead 37 which fits into a groove 38 of the sleeve. The opposite end of the sleeve has an upward turned edge 39, which is forced down to snap around the flange 34, so that the sleeve cannot be accidentally removed during operational use, thereby sealing the contents from contamination. The sleeve 36 may be made integral with the cap 11.

In pre-operative use, the device is initially in the position shown in figure 1, with edge 39 in the sealed dotted line position. Upon suitable rotation of the cap relative to the bottle the threads 15 and 16 cause the cap to descend, causing the needle to puncture the diaphragm, and allowing the bottle contents to flow out of the passage 21 when the device is inverted. The valve 26 prevents escape of the bottle contents out of the air filter unit 25.

The air filter bezel is removable for adding medication into the cap, which medication will be prevented from flow outward from the air filter by the check valve.

In a modified construction 50 shown in figure 3, the cap 51 is vertically, axially slidable on the bottle instead of being rotatable as above described. In this form of the invention, the cap includes a relatively thin integrally formed sleeve 52. The cap 51 and the sleeve 52 are both made of resilient material. The interior side wall of the cap includes an upper circular groove 57a and a lower circular groove 57b. The bottle includes on the outer side of the bottle neck an upper bead 55 and a lower bead 56. Prior to operative use, an upturned resilient lower edge 62 of the sleeve 52 is snapped around a flange 53 integrally formed on the bottle (see dotted lines). In operative use, the cap is simply pushed axially causing the cap groove to disengage bead 55 from the groove 57b. As the cap descends, the groove 57b snaps over bead 56, while at the same instant, the needles 60 and 61 pierce the diaphragm. The cap carries drip chamber 58 and air filter 59, each with its own needle 60 and 61 respectively. The needles pierce the plug diaphragm 18 upon downward travel, thus allowing outward flow of the formerly sealed bottle contents. The air filter 59 is provided with a valve similar to the ball valve 27 of figure 1 to prevent flow outwards through the filter.

WHAT WE CLAIM IS:—

1. A parenteral solution container and delivery cap therefor, the delivery cap comprising a top portion and a skirt portion, the top portion having a passage for parenteral

solution, the end of the passage outside the skirt being adapted for connection to a delivery tube, the end inside the skirt leading to a hollow needle for puncturing a sealing diaphragm when the latter is positioned in the neck of the parenteral solution container, the skirt portion being adapted for engagement with the neck of the container and carrying a flexible sleeve, one end of the sleeve being attached rigidly to the skirt, the other end having an inwardly directed flange, the neck of the container being adapted for co-operating engagement with the skirt, and the container having an outwardly directed flange for snap engagement with the flange of the flexible sleeve.

2. A combination as claimed in claim 1, in which the top portion has an air filter and valve connected to a second hollow needle.

3. A combination as claimed in claim 1, in which the hollow needle has a second passage connected to an air filter and valve.

4. A combination as claimed in any one of claims 1 to 3, in which the flexible sleeve is formed integrally with the skirt portion.

5. A combination as claimed in any one of claims 1 to 4, in which the flange on the container is formed integrally with the container.

6. A combination as claimed in any one of claims 1 to 5, in which the flange on the container extends circumferentially around the neck of the container.

7. A combination as claimed in any one of claims 1 to 6, in which the skirt portion and the neck of the container have co-operating screw threads.

8. A combination as claimed in any one of claims 1 to 6, in which the skirt portion has at least one circumferential groove and the container neck at least one circumferential ridge for co-operating snap engagement.

9. A combination as claimed in any one of claims 1 to 8, in which the hollow needle is formed integrally with the top portion of the delivery cap.

10. A combination as claimed in any one of claims 1 to 9, in which the mouth of the container is sealed by a diaphragm piercable by the hollow needle.

11. A combination as claimed in claim 1, substantially as described herein with reference to any one of figures 1, 2 or 3 of the accompanying drawings.

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